COMMON FARM HERBICIDES may cause LEAF TATTERS on Oaks

By Jayesh B. Samtani, James E. Appleby and John B. Masiunas

In Midwestern landscapes and nurseries, leaf tatters of oaks and common hackberry have been reported since the early 1980s. Vegetation surrounding the injured oaks and hackberry remain unaffected. Amongst the oaks, white and bur oaks are the species most affected by leaf tatters in the landscape.

Symptoms of tatters begin with browning (necrosis) of the interveinal tissues of young unfolding leaves (Photo 1). The necrotic area later drops off as the leaves continue to expand, leaving behind mostly the veins in fully expanded leaves (Photo 2).

A tree with leaf tatters in one year may not be affected the next year. Leaf tatters may affect part or the entire tree canopy. Later in the growing season, the trees will

Photo 1. Necrosis of the interveinal tissues of a young leaf (insert). As the leaves expand, the brown tissues drop off resulting in leaf tatters.

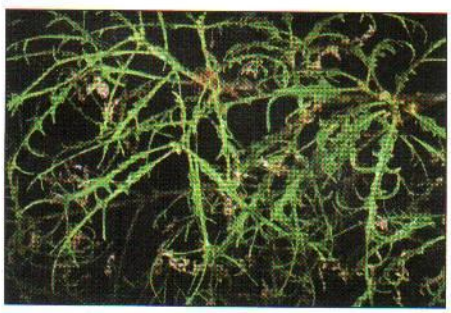

Photo 2. Leaf tatters on white oak in the landscape.

produce new flush(es) of normal leaves but the older leaves with tatters may remain. Trees with severe leaf tatters may become stressed, making them susceptible to other nutrient, weather or site pressures. A major concern for nurserymen, arborists, park managers and homeowners is the reduced aesthetic value of trees with leaf tatters.

In the past, insect feeding, frost injury, leaf diseases or herbicide drift were thought to cause leaf tatters. Hints to a possible cause of leaf tatters were observations that oak and hackberry trees near agricultural fields were most affected. Our research study with white oak and northern red oak found a group of herbicides (chloroacetanilides) including acetochlor, dimethenamid and s-metolachlor (active ingredients in Harness®, Outlook®, and Dual Magnum®, respectively) caused leaf tatter-like symptoms when seedlings in their leaf unfolding growth stage were exposed to these herbicides at rates simulating drift (Photo 3).

Photo 3. Unfolding oaks leaves are susceptible to herbicide injury.

Chloroacetanilide herbicides are commonly applied pre-emergence to corn, soybeans, sorghum and rice. Five to six days after exposure to chloroacetanilide

Photo 4. Discoloration of leaf tissues, five to six days after exposure to chloroacetanilide herbicides.

herbicides, the unfolding leaf tissue started to turn brown (Photo 4), resulting in tattered, fully expanded leaves. In both the white oak and northern red oak species, the seedlings with leaf tatters later produced a new flush of normal leaves, similar to in landscape settings.

In our previous study, white oak seedlings exposed to chloroacetanilide her-

Photo 5. Frost damage causes the death of the entire leaf, while only interveinal tissues die with leaf tatters.

bicides at the swollen bud, unfolding leaf or expanded leaf stage only developed leaf tatters at the unfolding leaf stage. White oak seedlings treated with herbicides from other herbicide groups also did not develop leaf tatters symptoms, although other symptoms of injury were observed. Herbicide rates used in this study also simulated drift conditions.

Symptoms of leaf tatters can be confused with damage caused by frost injury, anthracnose, wind damage or feeding of oak sawflies and Asiatic oak weevil. Frost injury to newly emerged oak leaves causes rapid death and the leaves turn brown and drop-off the trees (Photo 5).

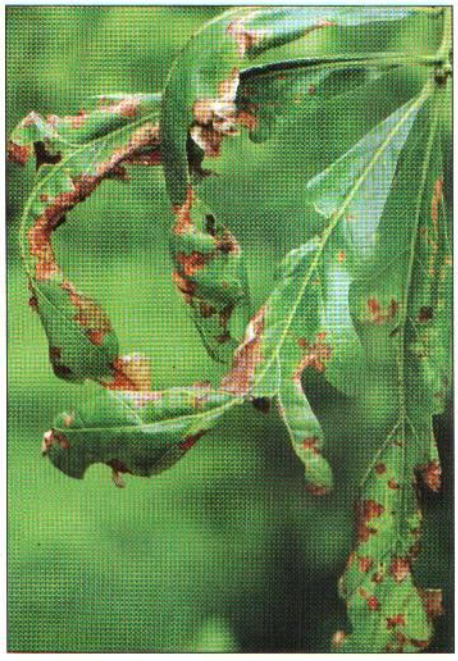

Photo 6. Oak anthracnose infects young leaves, causing tissue death and subsequent loss, and leaving ragged leaf margins.

Anthracnose is a fungal disease usually killing portions of oak leaves (Photo 6). The dead tissues eventually fall off leaving ragged leaf margins, whereas leaf edges of tatter leaves are smooth. Damage by strong winds causes oak leaves to be shredded, with ragged leaf edges (Photo 7).

Oak sawfly damage in late spring on an individual oak leaf does appear similar to leaf tatters (Photo 8), but will affect individual leaves, unlike leaf tatters. The Asiatic oak weevil is a ¼-inch-long greenish gray beetle that feeds in midsummer on interveinal tissues of oak leaves (Photo 9), producing different timing and injury

Photo 7. Strong winds can cause shredding of leaves, resulting in ragged leaf edges.

symptoms than leaf tatters.

Herbicide drift can be a problem in the Midwest, where topography is relatively flat and residential zones are often intermingled with agricultural farms. Further research is needed on the impact of leaf tatters on tree health.

Watering and fertilizing trees can minimize tree stress. Talk with nearby farmers so they can avoid applying chloroacetanilide herbicides when oak and hackberry leaves are unfolding. Always prevent herbicide drift by spraying in the absence of cross winds, when wind speeds are less than 10 mph, and by choosing spray nozzles producing large sized droplets.

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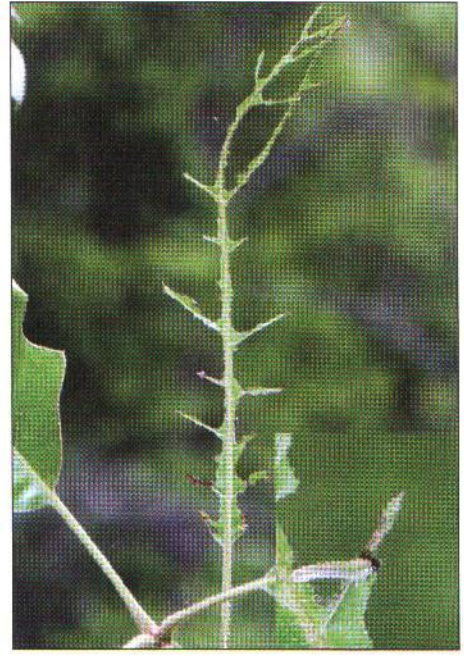

Photo 8. An oak sawfly larva about ½ inch long (insert). Oak sawfly damage confined to only a few leaves, unlike leaf tatters.

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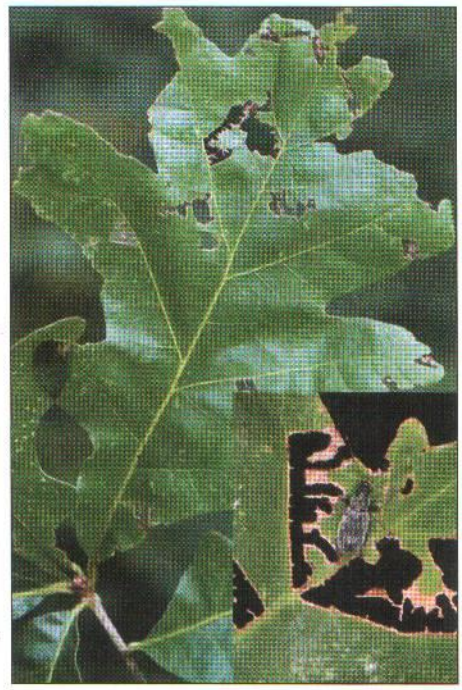

Photo 9. The Asiatic oak weevil is about ¼ inch long and a greenish gray beetle (insert) that feeds in midsummer on the interveinal tissues of oak leaves.